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ABSTRACT

To evaluate the effectiveness, and value to the university, of the tutoring provided by the University of Cincinnati's Tutorial and Referral Services, data were collected on the success of students tutored during the 1978-79 school year and on their subsequent retention. Student success was analyzed by race, sex, age and college. Data for 487 tutored and 284 nontutored students was analyzed. Attrition and grade data were isolated for all groups, and cost efficiency was examined by determining the number of students saved by the program (subtracting the percentage of tutored students who left school from the percentage of nontutored students who left school and multiplying that percentage by the number of students tutored). The savings generated by the program in terms of tuition, student activity fees, and the full-time equivalence subsidy from the state were then calculated. Analyses of student data revealed that 45.1% of the nontutored group in 1978-79 failed to enroll for the autumn quarter in 1979-80, whereas just 20.3% of the tutored group failed to enroll. Tutoring was found to have made a substantial difference in the retention of older students, blacks, and white males. Data are presented in 15 tables. (KM)

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WHAT'S TUTORING WORTH?: A REPORT ON RETENTION AND COST EFFECTIVENESS

by

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As the financial constraints of the 1980s lead to increased belt-tightening at the University of Cincinnati and other academic institutions across the nation, considerable interest centers on the need for developing programs which will retain students. Diminishing numbers of middle class students have prompted university personnel to recruit actively to those non-traditional students who just a decade ago rarely attended institutions of higher education. Retention of such students presents a special problem, as college "dropouts" more commonly come from lower socioeconomic backgrounds than their traditional counterparts, rank lower in their high school classes, and are more likely to be black (Astin 1964, 1975; Tinto 1975).

The research that is available on retention strategies suggests that tutoring is strongly implicated in retention. One 1971 study discovered that the attrition rate of residence hall students who were tutored was 16.7%, compared with a 20.2% rate for a random group of students (Taylor, Roth and Hanson 1971). In the same year Ladessa Yuthas revealed that two groups of tutored students in a college remedial reading program at Metropolitan State College of Denver had attrition rates of 45% and 29%, whereas the rates for two control groups were 55% and 80% (Yuthas 1971). A one year tutorial program, designed to reduce the incidence of academic failure and attrition among engineering students at the University of Minnesota, successfully retained 85.9% of the tutored students; only 66.3% of non-tutored students were retained (Taylor, Cartwright and Hanson 1970). Not surprisingly, then, another study discovered that re-entry students who continued to attend classes at thirteen northern California community colleges valued tutoring much more highly than those who did not remain in school (Reimal 1976).

Unfortunately, tutorial retention/attrition studies have rarely dealt with many students or with a comprehensive, campus-wide program. Nor are they able to utilize matched control groups, since ethical considerations preclude the random denial of service to students. Clearly, more research is needed to validate E. Martin Etters' statement that "For many low achievers, the tutorial assistance may well have meant the difference between...progress for graduation and an added accumulation of low grades which would have been a further handicap toward the minimum 'C' average needed for graduation" (Etters 1967).

It is especially important, in these times of program reductions, that tutorial programs demonstrate their value in terms of cost effectiveness. If they are not retaining significant numbers of students and thereby generating an income for the university, institutions may opt to discontinue such programs. If, on the other hand, tutoring can be proven to be cost efficient, this may convince university personnel to fund such programs at a higher level, resulting in the retention of even larger numbers of students.

In an effort to evaluate the effectiveness (and value to the university) of the tutoring provided by the University of Cincinnati's Tutorial and Referral Services, this investigator collected data on the success of students tutored during the 1978-79 school year, and on their subsequent retention. Student success was measured not only collectively but was broken down by race, sex, age, and college. This data is presented and evaluated as a case study suggestive of the role that tutoring can play in student retention at today's institutions of higher learning.

STUDY DESIGN AND METHODOLOGY

Composition of the Populations Studied

Funded during 1978-79 by a Comprehensive Employment Training Act grant, this Student Affairs sponsored program tutored 512 students from

n=512

fourteen colleges at the University in 43 subject areas. These students met with a tutor for one or more hours in one or more quarters of the year. Some of the assistance received took the form of group tutoring--one tutor working with two to five students--but most of it was individual and took place in sessions usually of an hour's duration. Although a student could receive assistance in more than one course, during any given quarter the vast majority of students requested help with only one course.

Since demand was considerably higher than the funds appropriated, 326 students were not served after they requested assistance. This group possessed the motivation to seek help--a characteristic control groups in the existing tutorial literature have invariably lacked--but they made their requests at a time during a given quarter when all appropriate tutors were fully assigned.

Some members of the tutored and nontutored groups have not been included within this study. All students who graduated during the 1978-1979 year were omitted; these numbered 29. Also deleted were requesting students who did not receive assistance from Tutorial and Referral Services but did go on to ask for help from other developmental educational programs--either those connected with the Center for Developmental Education or the Minority Students Engineering Program. There were 38 such students. Removing these 67 students from our totals yielded a final figure of 487 tutored and 284 nontutored students.

Comparison of the Tutored and Nontutored Groups

Any conclusions about attrition are dependent on the extent to which the tutored and nontutored students resemble each other in those measures which demonstrate the capabilities and characteristics they possessed before they requested tutoring. Therefore, comparisons were made between the tutored experimental and nontutored control groups in several areas,

including race, sex, ACT composite scores, SAT verbal and mathematics scores, high school rank, age, year in school, and grade point average at the time service was requested. A t-test was conducted on the two populations for all of these areas and a level of significance determined based on the pooled or separate variance estimate, as appropriate.

The t-test revealed that there were only two areas of significant difference, and both of these would tend to make our comparative conclusions on attrition and retention appear less rather than more supportive of tutoring's impact. First, since more blacks were in the tutored group and blacks generally have a higher dropout rate than whites, it is reasonable to surmise that, had the percentage of blacks in the nontutored group been equal to that of the tutored group, the total number of nontutored students leaving school would be considerably higher. Therefore, this investigator has chosen to isolate and compare attrition rates based on race. In actuality, if the students who subsequently sought assistance elsewhere were left in our control group there would be no difference in the percentage of blacks in the nontutored and tutored populations. Apparently, whites did not so readily seek help from other programs on campus. Interestingly, the only college which had a significantly larger percentage of blacks than whites receiving tutorial assistance was University College, but the difference there was large enough to affect the composite statistics as well. The second area of significant difference appeared in SAT mathematics scores, which were higher in the nontutored group. In only two colleges was the actual difference significant at the $p < .05$ level; these were Evening and Engineering Colleges, and their differences were also large enough to affect the overall results. Again, however, if the scores of the nontutored group were equal to those of the tutored population, we would expect that an even larger percentage of nontutored students would have left school.

TABLE I. ACT COMPOSITE DATA

College	Experimental Group N Students	Experimental Group N w/ACT Scores	Experimental Group $\bar{y}$ ACT	Experimental Group θ	Control Group N Students	Control Group N w/ACT Scores	Control Group $\bar{y}$ ACT	Control Group θ	T Value	Prob.	Univ. Wide Mean
Arts & Sciences	156	87	17.0	5.58	84	49	17.6	6.72	-.54	.59	22
University	117	63	10.5	3.71	66	26	11.0	5.29	-.40	.69	15
Business Adminis.	82	49	15.6	5.39	61	31	17.9	4.52	-2.02	.05	21
Engineering	42	29	22.8	4.28	23	17	24.1	3.00	-1.25	.22	26
Evening	20	3	12.7	4.62	20	2	11.5	3.54	.32	.77	20
Other	70	37	15.8	6.07	30	15	15.5	5.85	.19	.85	20
Overall	487	268	15.6	6.15	284	140	16.9	6.60	-1.89	.06	20

TABLE II. SAT SCORES

College	Experimental Group N Students	Experimental Group N Students w/SAT Scores	Experimental Group μ Verbal SAT	Experimental Group θ	Experimental Group μ Math SAT	Experimental Group θ	Control Group N Students	Control Group N Students w/SAT Scores	Control Group μ Verbal SAT	Control Group θ	Control Group μ Math SAT	Control Group θ	T Value (Verb.)	Prob.	T Value (Math)	Prob.	Univ. Wide Verb. SAT Mean	Uni Wid Ver SAT Mea
A & S	156	66	447	101	464	102	84	24	432	126	481	101	.53	.60	-.70	.49	470	513
University	117	23	325	93	328	87	66	11	323	80	379	77	.08	.94	-1.72	.10	368	391
Bus. Adm.	82	31	383	88	408	108	61	25	386	84	437	70	-.14	.89	-1.19	.24	438	513
Engineering	42	28	440	85	511	98	23	15	458	76	569	71	-.70	.49	-2.23	.03	512	621
Evening	20	3	383	60	337	35	20	1	430	0	620	0	-1.34	.31	-13.97	.01	421	429
Other	70	17	408	112	423	106	30	5	416	63	458	45	-.18	.85	-1.07	.30	437	478
Overall	487	168	413	104	437	114	284	81	407	103	470	99	.41	.68	-2.38	.02	444	496

TABLE III. HIGH SCHOOL RANK

College	Experimental Group N Students	N w/HS Rank	% Rank	θ	Control Group N Students	N w/HS Rank	% Rank	θ	T Value	Prob.	Univ Wide Rank
Arts & Sciences	156	108	31.6	23.0	84	56	30.2	20.8	.40	.69	1[illegible].0
University	1[illegible]7	73	48.8	25.7	66	30	48.2	24.5	.12	.91	30.5
Business Adminis.	82	56	40.0	24.4	61	43	38.3	23.2	.29	.77	21.5
Engineering	42	34	21.2	16.3	23	18	17.2	12.0	1.02	.3[illegible]	8.0
Evening	20	6	44.7	40.2	20	2	59.5	47.4	-.40	.73	40.3
Other	70	47	24.5	22.3	30	15	22.4	18.2	.37	.71	16.3
Overall	487	324	35.1	25.2	284	162	33.9	23.5	.47	.64	21.8

TABLE IV. INCOMING GRADE POINT AVERAGE

College	Experimental Group				Control Group					
	N Students	N Incoming Students w/GPA	$\bar{Y}$ GPA	θ	N Students	N Incoming Students w/GPA	$\bar{Y}$ GPA	θ	T Value	Prob.
Arts & Sciences	156	88	2.46	.73	84	53	2.45	.56	.00	1.00
University	117	65	1.78	.64	66	50	1.94	.67	-1.44	.15
Business Adminis.	82	51	2.47	.65	61	26	2.52	.68	- .13	.90
Engineering	42	20	2.22	.65	23	19	2.23	.66	- .00	1.00
Evening	20	12	2.40	.86	20	12	2.35	.61	.23	.75
Other Colleges	70	49	2.35	.53	30	19	2.30	.61	.24	.79
Overall	487	285	2.31	.70	284	179	2.31	.67	.00	1.00

TABLE V. YEAR IN SCHOOL

College	Experimental Group N Students	Experimental Group Year in School	Experimental Group θ	Control Group N Students	Control Group Year in School	Control Group θ	T Value	Probability
Arts & Sciences	152	1.94	1.14	84	1.94	1.25	-.00	1.00
University	116	1.38	.57	66	1.43	.64	-.54	.59
Business Adminis.	82	2.11	1.34	59	2.20	1.26	-.42	.67
Engineering	42	1.55	1.31	24	1.42	.58	.46	.65
Evening	9	2.33	1.50	13	1.92	1.04	.71	.49
Other Colleges	69	1.97	1.60	26	2.46	1.70	-1.27	.21
Overall	470	1.81	1.21	272	1.88	1.18	- .78	.44

TABLE VI. RACE

College	Experimental Group N Students	N Blacks	%	N Whites	%	N Other	%	Control Group N Students	N Blacks	%	N Whites	%	N Other	%	T Value	Prob
Arts & Sciences	156	68	43.6	83	53.2	5	3.2	84	31	36.9	49	58.3	4	4.8	1.01	.31
University	117	92	78.6	25	21.4	0	.0	66	33	50.0	33	50.0	0	.0	2.92	.00
Business Admin.	82	39	47.6	40	48.8	3	3.7	61	23	37.7	36	59.0	2	3.3	1.20	.23
Engineering	42	6	14.3	35	83.3	1	2.4	23	1	4.3	20	86.9	2	8.7	-.42	.68
Evening	20	8	40.0	12	60.0	0	.0	20	4	20.0	15	75.0	1	5.0	.59	.56
Other Colleges	70	31	44.3	32	45.7	7	10.0	30	15	50.0	14	46.7	1	3.3	1.00	.32
Overall	487	244	50.1	227	46.6	16	3.3	284	107	37.7	167	58.8	10	3.5	2.78	.01

Control has fewer Blacks, more Whites

TABLE VII. AGE

College	Experimental Group N Students	Experimental Group $\bar{Y}$ Age	Experimental Group θ	Control Group N Students	Control Group $\bar{Y}$ Age	Control Group θ	T Value	Probability
Arts & Sciences	156	21.9	5.03	84	21.3	5.24	.44	.66
University	117	23.2	7.04	66	22.2	4.11	-1.17	.25
Business Adminis.	82	21.4	2.71	61	20.9	4.11	-.79	.43
Engineering	42	20.8	2.86	24	20.3	2.05	-.96	.34
Evening	20	34.0	13.30	20	31.9	8.90	-.57	.57
Other	70	22.4	5.51	30	26.4	9.90	2.55	.01
Overall	487	22.7	6.65	284	22.9	6.29	.41	.68

TABLE VIII. SEX

College	Experimental Group N Students	N Males	%	N Females	%	Control Group N Students	N Males	%	N Females	%	T Value	Prob.
Arts & Sciences	156	67	42.8	89	57.1	84	36	42.8	48	57.1	.36	.72
University	117	33	28.2	84	71.8	66	26	39.4	40	60.6	.51	.61
Business Adminis.	82	44	53.7	38	46.3	61	31	50.8	30	49.2	-.43	.67
Engineering	42	32	76.2	10	23.8	23	20	86.9	3	13.1	1.18	.24
Evening	20	9	45.	11	55	20	6	30.	14	70.0	-.65	.52
Other Colleges	70	25	35.7	45	64.3	30	11	36.7	19	63.3	-.25	.81
Overall	487	210	43.1	277	56.9	284	130	45.8	154	54.2	.43	.67

Despite the overall similarity of the tutored and nontutored populations, the results could be somewhat misrepresentative if there were significant differences between the experimental and control groups by college, or if certain colleges had disproportionate numbers of students in either the tutored or the nontutored populations. Neither proved to be the case. Altogether, there were only five areas where $p < .05$: the racial composition of University College students, the SAT mathematics scores for Evening and Engineering Colleges, the ACT composite scores for the College of Business Administration, and the age of the students from the nine colleges listed as Other. All of these differences were in a direction which would quite probably add to the significance of whatever retention differences we did find in favor of tutoring. Since a break-down of the variables by college demonstrated that the tutored and nontutored populations were similar in almost every respect, the study's composite findings are not illusory. Tables 1-8 provide substantiation and further indicate some of the concrete differences between colleges. In a few instances, the overall University data is included to demonstrate how the students who asked for help compared with the overall student population by college.

Objectives and Parameters of the Study

After the essential similarity of the tutored and nontutored populations was determined, both groups were checked against the University's enrollment records for each quarter of the 1978-1979 and 1979-1980 years to determine which students left the University. If tutoring helped students to succeed academically, we would expect nontutored students to have both a higher attrition rate and a lower cumulative grade point average. (Based on the overall pre-tutoring similarity of the two groups, it was anticipated that dropping out for reasons unrelated to grades would be equally prevalent in both groups.) Although academic probation requirements varied from college

to college, a 2.00 cumulative grade point average was almost universally the break-off point, and this determined our differentiation of students into two categories, those with under a 2.00 and those with a 2.00 or higher. However, since grades may be more closely connected to attrition for certain groups of students (say blacks as compared with whites, men as compared with women, and older students as compared with younger), attrition and grade data were isolated for all such groups and the results analyzed.

Moreover, since the cost efficiency of a tutorial program such as this one is another unavoidable concern in these times when funding is hard to come by, we needed to know the extent to which this program and, by implication, other similar programs could diminish the potential loss of university income by retaining students who would otherwise leave. Since the tutored and nontutored populations were similar in their academic characteristics before tutoring was initiated, if there was nevertheless found to be a substantial difference in attrition between those populations, then we could reject the null hypothesis that tutoring had no effect on retaining students. Such findings would strongly suggest that tutoring saves students for the University. The number of students saved could then be determined by subtracting the percentage of tutored students who left school from the percentage of non-tutored students who did so and multiplying that percentage by the number of students tutored.

Once the number of students saved by the program was discovered, it became possible to calculate the savings generated by Tutorial and Referral Services in terms including tuition, student activity fees, and the full-time equivalency subsidy from the state of Ohio. The tuition per year (three quarters) for 1978-1979 was $810. This amount remained the same in the next year, but increased to $918 for the 1980-81 year. In addition, student activity fees for each full-time student were $150, $195, and $216 during

the same three years. The FTE subsidy varied considerably from course to course, from a low of $716 (General Studies I category) to a high of $8,369 (Medical II category); the corresponding range for 1979-1980 was from $741 to $9,648. The FTE subsidy is based on fifteen credit hours per student enrolled during the autumn quarter of the year. Therefore, to achieve a mean FTE value per full-time student, the overall FTE subsidy for undergraduate courses ($29,998,543 in 1978-1979 and $34,252,547 in 1979-1980) was divided by the number of full-time equivalencies in those years (23,350 in the former and 23,194 in the latter). This gave a mean of $1,284.73 per fifteen credit hours in 1978-1979 and $1,476.78 in 1979-80. By assuming a 14.94% increase--the difference between the 1978-1979 and 1979-1980 figures--in the average FTE allotment for the 1980-1981 year and again for the 1981-1982 term, then adding to that the increases in tuition and fees, we were able to estimate the mean income that would be generated by a full-time student over a four year span.

The average student tutored by Tutorial and Referral Services carried 15.6 credit hours during each quarter of the 1978-1979 year; when those courses which were not subsidized through FTE's (essentially the remedial offerings) were subtracted the mean dropped to 15.2. This investigator calculated that the average tutored student who remains enrolled for three quarters each year generated and will generate for the University the following amounts:

	1978-1979	1979-1980	1980-1981	1981-1982
FTE	$1,284.73	$1,476.78	$1,697.41	$1,951
Tuition	810.00	810.00	918.00	918
Activity Fees	150.00	195.00	216.00	216
Total	$2,244.73	$2,481.78	$2,831.41	$3,085

It was necessary, of course, to correct for those students who enrolled in autumn but not in subsequent quarters, and for those students who did not enroll during autumn quarter (and, as a result, were not calculated in the FTE figures), but who did enroll later in the year. Since there was no way to know which courses students who left the University would be taking if they had remained in school, we used the mean FTE as a measure of the amount of income those students could reasonably have been expected to generate.

In calculating the average amount generated by each student remaining in school, it appeared reasonable to exclude graduate and medical students' FTEs and tuition, because we could not realistically expect that the students tutored will go beyond the bachelor's level. Some of them, of course, will and tutorial support may, in part, be responsible for that choice. We could not, however, be sure, and therefore wished to limit this study to income generated over four years of undergraduate work. Again, some students will take longer than four years to finish their bachelor's work, but we used only a four year time span. We assumed that sophomores and pre-juniors tutored in 1978-1979 will graduate in 1980-1981 and juniors in 1979-1980. Our resulting estimates of actual monies saved, then, will be conservative.

RESULTS

Attrition/Retention

Although the tutored and nontutored groups were similar in their academic performance and potential (as measured by ACT and SAT scores) before they requested assistance, they were not equally likely to remain in school. Fully 45.1% of this nontutored group in 1978-1979 failed to enroll for autumn quarter of 1979-1980, whereas just 20.3% of the tutored group failed to do so. This difference in attrition held up for all colleges of the University. The overall difference is significant at the .0001

level, and the differences for Arts and Sciences and University College students is significant at the $p < .001$ level. For Business Administration students, $p = .002$.

The relatively small group of tutored students who combined high frequency of usage with the greatest extension of service over time were the most likely of all students to be retained. That is, of those students who received ten or more hours of tutoring per academic quarter for all three quarters of the 1978-1979 year, just 7.1% (n = 2 of 28 students) did not enroll in autumn quarter of 1979. Of those regularly tutored for only two quarters, 8.6% failed to enroll (n = 3 of 35 students). This suggests that the statistical case for tutoring documented here is even more dramatic than it appears if one erroneously assumes that all the students in the tutored population were in fact equally tutored, and therefore equal recipients of the time and money invested by the program. For the best possibility of retention, resources and effort should be committed to helping each student for at least two consecutive quarters, and preferably three.

It appears that the nontutored group's attrition rate was twice as high as that of the tutored group largely because nontutored students were not making the grades necessary both to keep them in school and to maintain their self-esteem. Although 41.2% of all nontutored students had a cumulative grade point average of less than 2.00 at the end of the 1978-1979 year, just 27.5% of all tutored students fell into that category. When only those students who left school are considered, 51.5% of the tutored and 58.6% of the nontutored left with a grade point average of under 2.00. This suggests that helping students to improve their academic skills is a crucial dimension of retention; even if no other effort to retain students is made, regular tutoring can save one-third or more of them. Students themselves indicated as much. On a quarterly evaluation survey mailed to all tutored

students, 34% of the respondents maintained that they would not have been able to survive in the University without tutorial assistance.

Tutoring made a substantial difference in the retention of older students, blacks, and white males. Only 11.6% of all tutored students aged thirty or more failed to enroll for the 1979-1980 school year, compared with 33.3% of those in the same age group who were not tutored. The corresponding attrition percentages for students aged 25 to 29 years were 25.6% and 34.8%, respectively. But the most astounding difference between the tutored and nontutored populations existed for black men, who had an 11.8% attrition rate when tutored versus a 63.9% rate for the nontutored. For black women the margin of difference was also high--with a 20.5% attrition rate for the tutored and a 50.7% rate for the nontutored. Comparative percentages for white males were 21% (tutored) and 50.6% (nontutored). Only for white women were the attrition percentages no lower among the tutored than the nontutored.

White males and blacks of both sexes who dropped out had trouble with grades. Of those leaving blacks who had received tutoring, 62.5% of the males and 77.7% of the females did not make an overall 2.00, while 78.3% of the black males and 83.3% of the black females who were not tutored and left school fell short of that grade point average. The performance of white males who dropped out roughly paralleled that of black men, with 44.8% of tutored white males and 71.1% of the nontutored leaving school with less than a 2.00. White female dropouts had the least problem with grades. Although 27% of all tutored white women left school--the highest attrition rate for any tutored group--just 12.5% of these dropouts had a grade point average of less than 2.00. Non-tutored white females who failed to re-enroll were twice as likely to have a grade point average of less than 2.00.

Of all tutored groups, then, white females were the most inclined to leave school without being in academic trouble. Nearly one out of every four (23.6%) tutored white women dropped out of school with a grade point average above 2.00, whereas the percentage of white males in that category was less than half as high--at 11.6%. In even greater contrast, 4.5% of tutored black females and 4.4% of tutored black males left for non-grade related reasons. Corresponding percentages for the nontutored were 19.2% for white women, 13.5% for white men, 30% for black women, and 21.8% for black men.

These figures indicate that, whereas there was no substantial difference in the frequency with which nontutored and tutored whites who had a 2.00 or higher left school, a marked difference existed for blacks of both sexes. Since nontutored blacks were three to five times as likely to drop out of school, even when they were making adequate grades, tutoring apparently had important psychological as well as academic impact in alleviating some of the frustration and alienation blacks experienced in attempting to adjust to a new and at times seemingly hostile environment. (Factors other than tutoring which could have influenced black retention, such as financial problems or conditions of employment, would presumably have appeared as uniformly in the tutored as the nontutored population. We do know that there was no difference in the two populations in terms of percentage of families on public assistance, percentage of students on financial aid, and percentage of students who worked.)

For white women and men, the psychological effect of tutoring was less obviously profound. Clearly, more research is needed to determine why one out of every four white woman who sought academic assistance and made adequate grades left the university. Several factors may have been responsible, including but not limited to fear of success, a less firm commitment

to higher education for a variety of reasons, and perhaps even a greater likelihood to shop around among colleges in the Cincinnati area (a factor suggested by some quite tentative data).

Overall, the evidence for our program is clear: tutoring retained a substantial number of students who might otherwise be expected to drop out. This was especially true for black students. In some colleges the attrition rate of black students who did not receive tutoring was three or four times higher than that of those who did. The largest difference existed among University College students; for them the 19.6% attrition rate for tutored blacks stood in stark juxtaposition to the 72.7% rate for those blacks who applied for but did not receive assistance. In Arts and Sciences the difference was also great--19.1% for tutored and 58.1% for nontutored blacks. Although attrition was relatively lower in the College of Business Administration, even there 43.5% of the nontutored but only 12.8% of the tutored blacks failed to enroll in the autumn quarter of the 1979-1980 year. Overall, 18% of the tutored and 55% of the nontutored blacks left the University.

For whites the margin of difference was less, but still attrition was approximately twofold higher for the nontutored. The attrition rate for tutored whites resembled that of tutored blacks in Arts and Sciences, Business Administration, and Engineering Colleges, but was somewhat higher than the black rate in University, Evening, and Other Colleges. For the nontutored, however, the attrition rate of whites was approximately 15% lower than that of blacks in most colleges. All in all, 23.3% of tutored and 39.5% of nontutored whites who contacted this program left the University.

A comparison between students who left and students who stayed revealed few statistically significant differences in the characteristics or capabilities they possessed before requesting service. Among non-tutored students,

those leaving Engineering College were younger and those leaving University College were more likely to be black. Among tutored students, those leaving Arts and Sciences were more likely to be female and to have lower ACT scores, those leaving Engineering College also had lower ACT scores, and those leaving other colleges were more likely to be upper-classpersons and women. However, the number of students in each of these groups was generally so small that any oddity disproportionately affected the results. There were no overall differences between leaving and staying students in either the tutored or nontutored groups.

As has been demonstrated, the attrition rate of the nontutored greatly exceeded that of the tutored students, largely because of unacceptably low grades but it must also be noted that even more of the nontutored group may withdraw from school in the foreseeable future. Although these potential dropouts are, of course, not included in any computations here of the number of students saved, it is a fact that the grades of many of the nontutored students who re-enrolled for the 1979-1980 year were nevertheless low. Most notably, 61.5% of all nontutored black males remaining in school had a grade point average of under 2.00, compared with 28.5% of all remaining black males who were tutored. Less than a third of tutored but more than half of nontutored black females who remained had under a 2.00. For whites the differences were less dramatic: 20.5% for nontutored white males retained, compared with 12.8% for tutored white males; and 12.3% for nontutored white females retained, compared with 10.8% for tutored white females. It appears inescapable that many of the blacks who requested but did not receive tutoring will soon be gone because of probation requirements, and this means that tutoring will ultimately have saved an even larger proportion of tutored students than the attrition statistics here indicate. For blacks especially, then, tutoring is crucial.

TABLE IX. BLACK MALE ATTRITION/RETENTION DATA

College	Experimental Group						Control Group							
	N Stu.	N Leaving	%	N Retained Students w/under 2.00	% Ret. Stu.	N Students Leaving w/under 2.00	% Leav. Stud.	N Students	N Leaving	%	N Retained Students w/under 2.00	% Ret. Stud.	N Students Leaving w/under 2.00	% Leav. Stud.	T Value	Prob.
Arts & Sci.	19	2	10.5	9	52.9	1	50.	14	7	50.	4	57.1	6	85.7	-2.52	.02
University	23	2	8.7	4	19.0	1	50.	14	12	85.7	2	100.	9	75.	-6.75	.00
Bus. Adm.	15	1	6.7	3	21.4	0	0.	5	3	60.	1	50.	2	66.7	-1.79	.13
Engineering	2	0	0.	0	0.	0	0.	0	0	0.	0	0.	0	0.	----	---
Evening	1	0	0.	0	0.	0	0.	0	0	0.	0	0.	0	0.	----	---
Other	8	3	37.5	1	33.3	3	100.	3	1	33.3	1	50.	1	100.	.23	.83
Overall	68	8	11.8	17	28.3	5	62.5	36	23	63.9	8	61.5	18	78.3	-5.79	.00

TABLE X. BLACK FEMALE ATTRITION/RETENTION DATA

College	Experimental Group							Control Group								
	N Stu.	N Leaving	%	N Retained Students w/under 2.00	% Ret. Stu.	N Students Leaving w/under 2.00	% Leav. Stud.	N Students	N Leaving	%	N Retained Students w/under 2.00	% Ret. Stud.	N Students Leaving w/under 2.00	% Leav. Stud.	T Value	Prob.
Arts & Sci.	49	11	22.4	10	26.3	8	72.7	17	11	64.7	5	83.3	5	100.	-3.16	.00
University	69	16	23.2	20	37.7	12	75.	19	12	63.2	5	71.4	5	100.	-3.21	.00
Bus. Adm.	24	4	16.7	5	25.	4	100.	18	7	38.9	3	27.3	2	66.7	-1.57	.13
Engineering	4	1	25.	1	33.3	1	100.	1	0	0.	0	0.	0	0.	1.00	.39
Evening	7	1	14.3	4	66.7	1	100.	4	2	50.	1	50.	1	50.	-1.11	.32
Other	23	3	13.0	5	25.	2	66.7	12	4	33.3	4	50.	2	50.	- .68	.51
Overall	176	36	20.5	45	32.1	28	77.7	71	36	50.7	18	51.4	15	83.3	-3.00	.00

TABLE XI. WHITE MALE ATTRITION/RETENTION DATA

College	Experimental Group						Control Group							
	N Stu.	N Leaving	%	N Retained Students w/under 2.00	% Ret. Stu.	N Students Leaving w/under 2.00	% Leav. Stud.	N Students	N Leaving	%	N Retained Students w/under 2.00	% Ret. Stud.	N Students Leaving w/under 2.00	% Leav. Stud.	T Value	Prob.
Arts & Sci.	48	7.	14.6	5	12.2	4	57.1	20	13	65.	1	14.3	10	76.9	-5.12	.00
University	10	5	50.	2	40.	2	40.	12	8	75.	2	50.	8	100.	- .76	.46
Bus. Adm.	27	5	18.5	1	4.5	2	40.	25	10	40.	1	6.7	7	70.	-2.07	.05
Engineering	29	6	20.7	3	13.	2	33.3	18	6	33.3	3	25.	6	50.	- .92	.37
Evening	8	3	37.5	1	20.	1	33.3	6	3	50.	1	33.3	2	66.7	- .43	.67
Other	16	3	18.8	2	15.4	2	66.7	8	5	62.5	1	33.3	0	0.	-1.06	.32
Overall	138	29	21.	14	12.8	13	44.8	89	45	50.6	9	20.5	33	61.1	-4.84	.00

TABLE XII. WHITE FEMALE ATTRITION/RETENTION DATA

College	Experimental Group						Control Group							
	N Stu.	N Leaving	%	N Retained Students w/under 2.00	% Ret. Stu.	N Students Leaving w/under 2.00	% Leav. Stud.	N Students	N Leaving	%	N Retained Students w/under 2.00	% Ret. Stud.	N Students Leaving w/under 2.00	% Leav. Stud.	T Value	Prob.
Arts & Sci.	35	10	28.6	4	16.	1	10.	29	7	24.1	0	0.	3	42.9	.39	.70
University	15	6	40.	3	33.3	2	33.3	21	10	47.6	1	9.1	2	20.	- .44	.66
Bus. Adm.	13	0	0.	0	0.	0	0.	11	1	9.1	3	30.	0	0.	-1.00	.34
Engineering	6	0	0.	0	0.	0	0.	2	0	0.	0	0.	0	0.	1.00	1.00
Evening	4	1	25.	0	0.	0	0.	9	3	33.3	2	33.3	1	33.3	- .87	.39
Other	16	7	43.8	0	0.	0	0.	6	0	0.	1	16.7	0	0.	-2.45	.04
Overall	89	24	27.	7	10.8	3	12.5	78	21	26.9	7	12.3	6	28.6	.08	.93

TABLE XII. EXTENT OF ACADEMIC DIFFICULTY

College	Black Males						Black Females					
	Experimental			Control			Experimental			Control		
	N Students	N w/under 2.00	%	N Students	N w/under 2.00	%	N Students	N w/under 2.00	%	N Students	N w/under 2.00	%
Arts & Sci.	19	10	52.6	14	10	71.4	49	18	36.7	17	10	58.8
University	23	5	21.7	14	11	78.6	69	21	30.4	19	10	52.6
Bus. Adm.	15	3	20.	5	3	60.	24	9	37.5	18	5	27.8
Engineering	2	0	0.	0	0	0.	4	2	50.	1	0	0.
Evening	1	0	0.	0	0	0.	7	5	71.4	4	2	50.
Other Colleges	8	4	50.	3	2	66.7	23	7	30.4	12	6	50.
Overall	68	22	32.4	36	26	72.2	176	62	35.2	71	33	46.5
	White Males						White Females					
Arts & Sci.	48	9	18.8	20	11	55.	35	5	14.3	29	3	10.3
University	10	4	40.	12	10	83.3	15	5	33.3	21	3	14.3
Bus. Adm.	27	3	11.1	25	8	32.	13	0	0.	11	3	27.3
Engineering	29	5	17.2	18	9	50.	6	0	0.	2	0	0.
Evening	8	2	25.	6	3	50.	4	0	0.	9	3	33.3
Other Colleges	16	4	25.	8	1	12.5	16	0	0.	6	1	16.7
Overall	138	27	19.6	89	42	47.2	89	10	11.2	78	13	16.7

TABLE XIV. OTHER MINORITY STUDENTS ATTRITION/RETENTION DATA*

College	Experimental Group							Control Group								
	N Stu.	N Leaving	%	N Retained Students w/under 2.00	% Ret. Stu.	N Students Leaving w/under 2.00	% Leav. Stud.	N Students	N Leaving	%	N Retained Students w/under 2.00	% Ret. Stud.	N Students Leaving w/under 2.00	% Leav. Stud.	T Value	Prob.
Overall	16	2	12.5	2	14.3	2	100.	8	2	25.0	1	16.7	2	100.	- .68	.51

*Includes 13 Orientals, 2 Hispanics, 1 American Indian, and 10 Foreign Students.

TABLE XV. ATTRITION/RETENTION DATA BY AGE

Age 30-67	51	6	11.7	6	13.3	4	66.7	39	13	33.3	5	19.2	8	61.5	-2.55	.01
Age 25-29	55	14	25.5	7	17.1	7	50.0	46	16	34.8	8	26.7	8	50.0	-1.46	.15
Age 17-24	381	77	20.2	70	23.0	38	49.4	197	97	49.2	31	31.0	57	58.7	-7.61	.00

Income Generated

Since tutoring has been found to significantly decrease the attrition rate for white males, blacks, and older students by increasing their academic success and, in the case of blacks, by providing needed psychological support, it is now possible to estimate the amount of money which tutoring generates for the University by retaining students who might otherwise be expected to leave. The difference in attrition rates by race and sex between those students tutored and those not tutored, multiplied by the number of students served in each group, yielded the number of students saved. Thus, the calculations for black males (.722 - .324 x 68 = n) gave a figure of 35 students saved. Correspondingly, the same calculations for other groups yielded 53 black females, 26 white males, 0 white females, and two other minority students saved. Multiplying the total of these figures (n=116) by the average income generated by each undergraduate student for 1979-1980 gave a sum of $287,886.48 which the tutoring program saved the University.

We must subtract, however, a portion of the tuition and fees calculated for tutored students who enrolled in the autumn quarter of 1979-1980 but failed to enroll in either winter or spring quarter or both. Students tutored in 1978-1979 and enrolled in autumn quarter of the next year subsequently missed a total of 24 quarters. Multiplying the $270 quarterly tuition and $65 fees by those 24 quarters and that figure by .248 (the portion of students saved) yielded six quarters, or $2,010. This reduced the amount saved to $285,876.48. This amount did not need to be reduced further by the percentage of students tutored in both 1978-1979 and 1979-1980 (5%) because the FTE monies/tuition/fees generated by those students (who cannot be saved twice) was almost exactly equal to the tuition income generated by saved students who enrolled in summer classes. These two groups balanced one another out and therefore were not considered.

Yet to be calculated is the amount of money previously saved the University by keeping students enrolled throughout the 1978-1979 year. One could expect the tutored students to have enrolled for 1,461 quarters (498 students x 3 quarters) during the year, while the nontutored could have enrolled in a maximum of 852 quarters. From this total must be subtracted the quarters for which late-enrolling students could not reasonably be expected to enroll; for example, a student enrolling in classes for the first time during spring quarter could not be expected to have attended classes in autumn or winter quarter, although a student enrolling in autumn quarter could, barring graduation, be expected to enroll in subsequent quarters. There were fifteen quarters each for the tutored and nontutored groups which must therefore be omitted from consideration. Tutored students failed to enroll in 72 of the 1,446 potential quarters, for an intra-year attrition rate of 5%. Nontutored students, on the other hand, failed to enroll in 77 of 837 potential quarters, or 9.2% of the total. Taking the difference between these two percentages and multiplying it by the total number of potential quarters of enrollment for tutored students gave the number of quarters saved in 1978-1979 ([.092 - .050] x 1446 = 61 quarters). That 61 quarters multiplied by the quarterly tuition and fees yielded $19,520 saved within the 1978-1979 year.

In short, considering only the students tutored during 1978-1979, Tutorial and Referral Services saved the University $19,520 during winter and spring quarters and an additional $285,876.48 during 1979-1980. To calculate how much will be saved in 1980-81 and 1981-1982, at which point all of the 1978-1979 population of tutored students can be expected to graduate, required an estimate of how many additional tutored students will drop out each year after 1979-1980 as well as subtraction of the saved upperclass men and women who could be expected to graduate each year. It

TABLE XIV. NUMBERS OF STUDENTS/QUARTERS SAVED BY TUTORIAL AND REFERRAL SERVICES, ALONG WITH THE INCOME GENERATED BY THOSE STUDENTS

	1978-79 Tutored Students		1979-80 Tutored Students		1980-81 Projected Students Tutored		1981-82 Projected Students Tutored		Total Income Generated
		Income Generated		Income Generated		Income Generated		Income Generated	
Number Quarters Saved, 1978-79	61	$ 19,520							$ 19,520
Number Students Saved for Enrollment in 1979-80.	116	$287,886.48							$ 287,886.48
Number Additional Quarters Lost After Autumn Quarter, 1979-80.	6	-$ 2,010							-$ 2,010
Number Quarters Saved, 1979-80			61	$ 20,435					$ 20,435
Number Projected Students Saved for Enrollment in 1980-81	103	$291,635.23	116	$328,443.50					$ 620,078.73
Number Projected Additional Qts. Lost After Autumn Quarter, 1980-81.	6	-$ 2,268	6	-$ 2,268					-$ 4,536
Number Projected Quarters Saved 1980-81					61	$ 23,058			$ 23,058
Number Projected Students Saved for Enrollment in 1981-82	61	$188,185	103	$317,755	116	$357,860			$ 863,800
Number Projected Additional Qts. Lost After Autumn Quarter, 1981-82.	6	-$ 2,268	6	-$ 2,268	6	-$ 2,268			-$ 6,804
Number Projected Quarters Saved, 1981-82							61	$23,058	$ 23,058
Total Income Generated by Tutoring		$780,680.71		$662,097.50		$378,650		$23,058	$1,844,486.21

also required taking into consideration the effect of inflation on FTE subsidies, tuition, and student activity fees. Assuming that the 24 non-enrolled quarters during 1979-1980 represent a reasonable, even conservative drop out/stop out figure, we must reduce whatever results are calculated by one-fourth of the income generated by those 24, or by six quarters. Six quarters translates into two students (6/3 quarters of the normal school year). Therefore, two saved students must be subtracted from the projected totals for 1980-1981, along with another six quarters for that year. Totals for the 1981-82 year must similarly be reduced by four saved persons plus an additional six quarters.

Finally, in order to calculate the estimated income to be generated by Tutorial and Referral Services, it was necessary to determine not only the amount of tuition, fees, and FTE monies returned to the University by those students receiving tutoring in 1978-1979 who might otherwise be expected to drop out, but also to figure the amount generated by every subsequent new group of incoming tutored students. We discover, by applying the same standards developed for the 1978-1979 group to the new 1979-1980, 1980-81, and 1981-1982 tutored populations, that the Tutorial and Referral Services can conservatively be expected to generate $880,054 annually by the 1981-1982 year, as Table XV explicates. That sum represents about a tenfold return on the original appropriation for the program.

CONCLUSION

This study has demonstrated that tutoring can be a matter of considerable consequence in many students' lives, and particularly in black students' lives. That is perhaps why 34% of all students tutored indicated they would not be in school without the program's initial assistance, and why students gave the program an overall 6.56 rating on a seven point scale, for its ability to answer their needs satisfactorily. As at least one

study has concluded, tutoring is a vehicle in building students' self-esteem so that they can learn how to cope with an alien and often frustrating academic environment. Tutoring can provide necessary assistance of both a personal and academic nature; moreover, it can benefit the University by retaining students who would otherwise leave. At present, the program is saving enough students to bring into the University of Cincinnati nearly one million dollars by 1981-1982. Yet, the program currently assists only a small proportion of the most needy students. For example, 52% of Arts and Sciences upperclass men and women who asked for help were on academic probation, yet we assisted only 2.3% of all Arts and Sciences students on academic probation. As another example, 98% of requesting University College sophomores were on probation, but the program helped only 6% of all University College students on probation. Fully 43.8% of regularly tutored students who requested assistance while on probation left it before the 1978-1979 year had terminated, compared with 8% of the nontutored students on probation. Many more students could be saved, and this program will continue to monitor student performance over the years in an effort to convert our projected estimates into concrete figures.

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